

SERUM SEPARATION PROTOCOL FOR FIELD PERSONNEL

Provided by the Texas Department of State Health Services, Laboratory Services Section

TRAINING PURPOSE

The Texas Department of State Health Services Laboratory Services Section has developed this training video to assist submitters and providers with the implementation of processing procedures for specimens submitted for HIV, hepatitis C, and syphilis testing.

TRAINING PURPOSE

Video - Introduction

SERUM SEPARATION PROTOCOL

OUTLINE

- I. Personal protective equipment (PPE)
- II. The clotting process
- III. The centrifugation process
- IV. The serum separation process for red-top tubes
- V. Serum specimen storage, packaging, and shipping
- VI. Safety concerns

SECTION I:

Personal Protective Equipment (PPE)

REQUIRED PPE FOR THE SERUM SEPARATION PROTOCOL



REQUIRED PPE FOR THE SERUM SEPARATION PROTOCOL

Video - PPE

SECTION II:

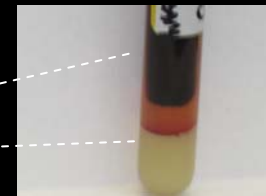
The Clotting Process

THE CLOTTING PROCESS

- Clotting begins when a blood sample is collected from a patient into a red-top tube or serum separator tube (SST).
- A specimen collected in a blood collection tube with clot activator should be inverted five times to facilitate the clotting process.
- Allow the specimen(s) to sit at ambient temperature until a clot has formed.
 - Red-top tubes may require up to 60 minutes, while serum separator tubes (SST) may require up to 30 minutes
- Once a clot has formed, the specimen is ready for centrifugation.



10 – 60 minutes



Video – Clotting process

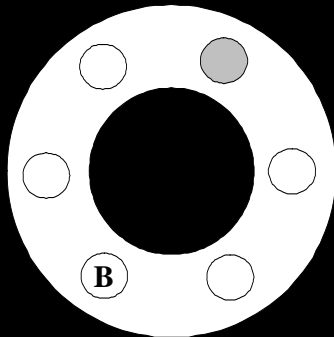
SECTION III:

The Centrifugation Process

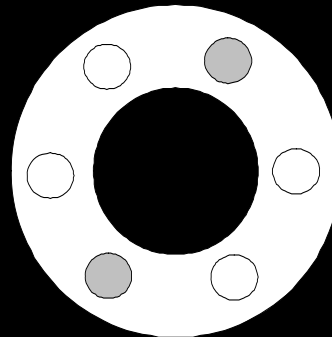
THE CENTRIFUGATION PROCESS

- Prior to centrifugation, the specimen tube should be re-examined for any hairline cracks that will cause the tube to break during the centrifugation process.
- When centrifuging specimens, it is very important to ensure that the centrifuge is balanced properly. Improper balancing can lead to damage to the centrifuge, personnel, or specimens.
- Place the specimen(s) in the centrifuge being sure to balance the load properly (see next slide). Tubes of the same type and size should be compared and matched according to similar fill volumes. If the number of specimens totals one or five, the use of additional “balance tubes” filled with water will be required.
- The correct spinning conditions for centrifuging serum specimens is 1100-1300 rpm for 15 minutes. Most clinical blood centrifuges only spin at one speed so you will just need to turn the timer to 15 minutes to start the centrifuge.
- Once the spin time is complete, it is very important to allow the rotor to stop spinning completely before opening the centrifuge lid. Failure to follow these instructions could cause serious injury to personnel. Be conscious of any possible broken tubes. If breakage has occurred, refer to the “Safety Concerns” flip-cards for further instructions. If no tubes are broken or damaged, remove the intact specimen(s) from the centrifuge.

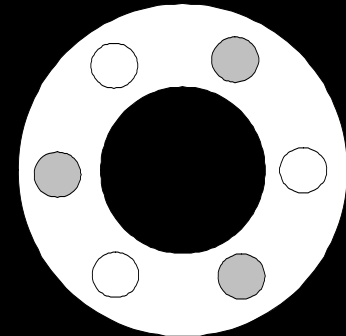
THE CENTRIFUGATION PROCESS



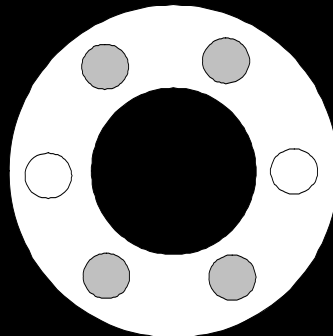
1 tube



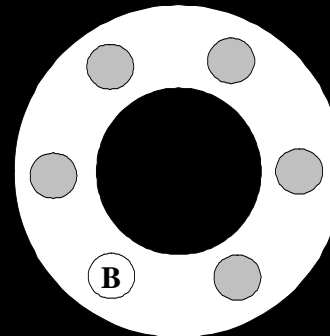
2 tubes



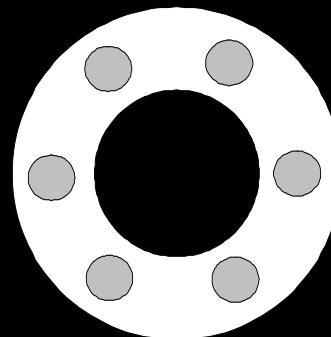
3 tubes



4 tubes



5 tubes



6 tubes



Volume-controlled water blank



Clotted blood specimen

THE CENTRIFUGATION PROCESS



Videos – Centrifugation process,
Centrifugation process 2, and
Centrifugation process 3

SECTION IV:

The Serum Separation Process for Red-Top Tubes

THE SERUM SEPARATION PROCESS FOR RED-TOP TUBES

The following materials are required to perform the serum separation protocol:



Tube rack



Transport container



Transfer pipette



Absorbent pad



PPE



Permanent marker



Biohazard bag/box

THE SERUM SEPARATION PROCESS FOR RED-TOP TUBES

- Assemble the required materials needed to perform the serum separation – test tube rack, transport container, transfer pipette, absorbent pad, label, permanent marker, biohazard container, and PPE.
- Label the transport container appropriately with the patient's information. Be sure to use a permanent marker because other marker types can become smeared and unreadable.
- Wearing the appropriate PPE, remove the stopper from the red-top tube and place it on the absorbent pad.
- Using a transfer pipette, remove the serum from the red top tube being careful not to disturb the clot, and dispense it into the appropriately labeled transport tube.
- Cap the transport tube, ensuring that the cap is secure. Replace the stopper in the red top tube, and discard the tube and transfer pipette in the biohazard container.

THE SERUM SEPARATION PROCESS FOR RED-TOP TUBES

- Pouring the specimen serum from the blood collection tube into a transport tube is discouraged for safety reasons.
- If collecting specimens in a serum separator tube (SST), the serum does not need to be transferred to a transport container after centrifugation. Please ensure that the fill volume adheres to the recommended instructions contained in the package insert.
- Place the labeled transport tube or centrifuged SST in a cooler or other cold storage device until ready for shipping.

Videos – Serum separation process,
Serum separation process 2

SECTION V:

Serum specimen storage, packaging, and shipping

SERUM SPECIMEN STORAGE, PACKAGING, AND SHIPPING

- When the specimens are ready to be shipped, remove the tubes from cold storage and, along with absorbent material sufficient to absorb tube contents, place into the plastic container provided with the shipping box. Place the plastic container into the shipping box and add at least two cold packs.
 - NOTE: Both cold packs must be cold or frozen before being placed into the cold shipping box.
- Place the styrofoam lid on the shipping box.
- Complete the appropriate specimen submission form for each specimen and place into the plastic bag.
- Ensure that the plastic bag containing the completed specimen submission forms is placed on top of the styrofoam lid before closing the box.
- Close the box securely and place the provided air bill in the sleeve located on top of the box.
- Ship specimens every day except on Friday, Saturday, Sunday, or the day before a federally observed holiday. Specimens must be shipped cold and received cold within 5 days of collection.

SERUM SPECIMEN STORAGE, PACKAGING, AND SHIPPING



Video – Packaging of specimens

SECTION VI: Safety Concerns

Safety Concerns – Blood Spill

- When a spill occurs, immediately remove any contaminated PPE and place it in a biohazard container.
- Inform others in the immediate area about the spill and retrieve your spill kit.
- When cleaning up spills, individuals should wear two pairs of gloves, a lab coat, and a face shield or safety glasses.
- Place absorbent material (pads from the spill kit or paper towels) around the contaminated area so you will be less likely to contaminate your clothing while cleaning up the spill.
- Use a mechanical device such as tongs, forceps, or cardboard to pick up any broken tube pieces and place in a biohazard sharps container.

Safety Concerns – Blood Spill

- Once you have removed all visible pieces of the blood tube, place additional absorbent material on the remaining contaminated area.
 - Working from the perimeter inward, soak the absorbent material with an appropriate disinfectant solution such as a 10% bleach solution. Allow the disinfectant to remain in contact with the contaminated area for at least 15 minutes.
- After 15 minutes, use a mechanical device to pick up the disinfectant soaked material and place in a biohazard sharps container. Apply clean absorbent material to assist with removing any residual fluid and place in the biohazard container.
- Remove gloves and dispose of in the biohazard container. Also remove lab coat if contaminated and place in biohazard container or contaminated laundry container. Wash hands thoroughly or use hand sanitizer after removing PPE.

Safety Concerns – Centrifuge Spill

Clean-Up

- If a blood tube breaks during centrifugation, immediately unplug the centrifuge and allow the rotor to completely stop.
 - It is recommended that you allow 10 minutes, or 30 minutes for know hazardous material, for any aerosols that were generated to settle before cleaning up the spill.
- Inform others in the immediate area of the spill and don the proper PPE (double gloves, lab coat, and safety glasses or a face shield).
- Use a mechanical device to remove the tube top and any tube pieces into a biohazard sharps container. Then remove the tube adapter from the rotor, being careful not to spill the contents.
- Add an appropriate disinfectant solution such as a 10% bleach solution to the adapter and let sit for at least 15 minutes.

Safety Concerns – Centrifuge Spill

Clean-Up

- After 15 minutes, pour the solution in the tube adapter onto absorbent material sufficient to absorb the fluid located within the biohazard sharps container.
- Place all contaminated absorbent material in the biohazard sharps container. Wash the tube adapter with disinfectant or soap and water.
- Remove gloves and dispose of in the biohazard container. Also remove lab coat if contaminated and place in biohazard container or contaminated laundry container.
- Wash hands thoroughly or use hand sanitizer after removing PPE.

Safety Concerns – Improperly Balanced Centrifuge

- An improperly balanced centrifuge can cause issues ranging from a loud roaring noise during spinning to centrifuge vibration that can severely damage the equipment.
- When centrifuging your blood tubes, ensure the centrifuge has reached its maximum speed before walking away.
- If you hear the loud roaring noise or see the centrifuge vibrating, immediately unplug the centrifuge. **Allow the rotor to completely stop before opening the lid.**
- Once stopped, check to see that the tubes are properly balanced in the rotor, as you can see the tubes are not balanced correctly.
 - If the tubes are balanced correctly in the rotor, check to see that the fill volumes for the tubes are balanced. Adjust the tubes as necessary and continue the centrifugation process.

Videos – Spill clean-up,
centrifuge spill clean-up,
Improperly balanced centrifuge